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CONTENTS

Jones—The Rediscovery of "Hesperia bulenta" Bdl.-Lec., with Notes on other Species (Lepid. Hesperiidae) 193
Hatch—Thomas Lincoln Casey as a Coleopterist 198
Metcalf—A Killing Bottle for Collecting Small Active Insects. 203
Porter—In South America 204
Champlain and Knull—Notes on Cerambycidae with Descriptions of New Species (Coleop.) 205
Herrick—The "Ponderable" Substance of Aphids (Homop.) 207
Abbott—Notes on the Habits of Formica dakotensis specularis (Emery) (Hym.: Formicidae) 210
Weiss—Frank Cowan and his "History of Insects" 212
Editorial—Henry Skinner 215
Changes of Addresses. 215
Personal Mention 215
Entomological Literature 216

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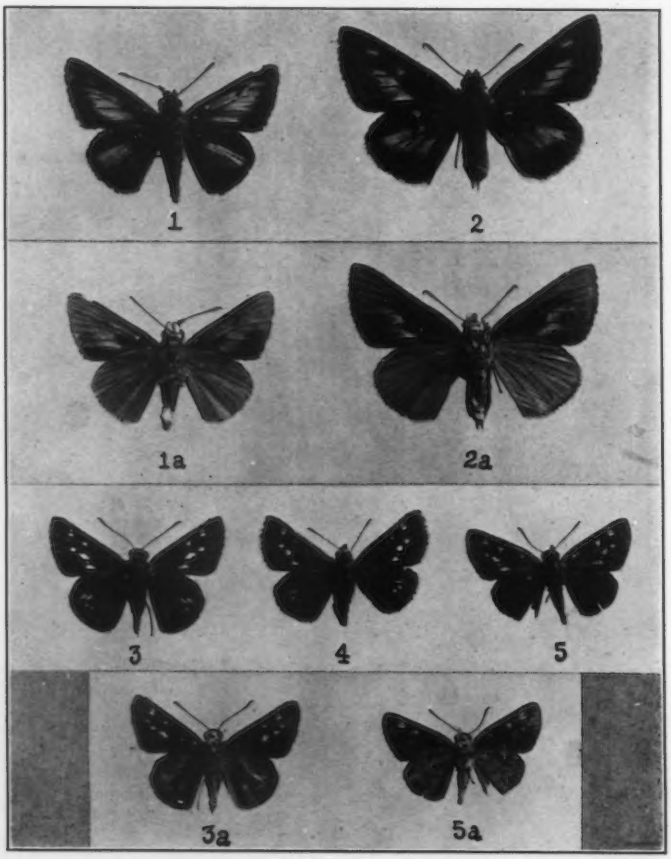


PROBLEMA BULENTA 1, 1A ♂, 2, 2A ♀; AMBLYSCIRTES CAROLINA 5, 5A ♀, A. CAROLINA REVERSA 3, 3A ♂, 4 ♀.—JONES.

ENTOMOLOGICAL NEWS

VOL. XXXVII JULY, 1926 No. 7

The Rediscovery of "Hesperia bulenta" Bdl.-Lec., with Notes on other Species (Lepid. Hesperiidae).

By FRANK MORTON JONES, Wilmington, Delaware.

(Plate IX.)

One of the puzzles handed down from the earlier days of North American lepidopterology has been the identity of "Hesperia bulenta" (Bdl.-Lec., Lep. Am. Sept., plate 67, 1833, with figures of the male, female, under surface of the female, the larva and the pupa, all reproduced without text description from drawings by Abbot). Do these figures represent a species improperly accredited to our fauna? Are they poor drawings of a species more familiar to us under another and later name? Or does such an insect exist, presumedly in coastal Georgia, but not rediscovered since Abbot's time?

In the subsequent literature, the name has been variously treated: from Smith's two lists (1891-1903) it is omitted; similarly from Skinner's Catalogue (1898) and Supplement (1904), and from Dyar's List (1902); Edwards (1872) lists it as a valid species, accrediting it to "Gulf States"; in his Catalogue of 1877 he refers his own species, *palatka*, to the synonymy under *bulenta;* and in his revised Catalogue of 1884 he restores *palatka* and lists *bulenta* among species omitted for want of authentication; Strecker (1878) lists *"pilatka"* Edw. as a synonym of *bulenta* Bdl.-Lec.; Scudder (1871) lists *bulenta* among species he has been unable to examine or determine, and in 1889 he refers *bulenta* Streck. to *palatka* Edw., but states that *bulenta* Bdl.-Lec. is not the same insect; Barnes & McDunnough (1917) place *bulenta* Bdl.-Lec., with a query, under *byssus* Edw. (if identical, *bulenta* would have priority); and Lindsey (1921) says he follows McDunnough in placing *bulenta* "tentatively as a synonym of *byssus*"; Skinner & Williams (1924) dissent from previous identifications and from the relegation of the name to the synonymy, and list *bulenta*

ENTOMOLOGICAL NEWS, ACAD. NAT. SCI. PHILADELPHIA, PENN'A.

as a species not available for study but included in their genus *Problema,* with *byssus* Edw. the genotype. We have then, Edwards, Scudder, Skinner & Williams, in their final references, agreeing that *bulenta* Bdl.-Lec. must be distinct from our recognized allied species.

In July, 1925, the writer made a collecting trip through coastal Virginia and North Carolina, with Wilmington, North Carolina, as his southern limit; at this point, crossing the ferry, which at frequent intervals connects the city with the two-mile causeway through the swamps (old rice lands) to the west, he found here a most favorable collecting place, especially for the *Hesperiidae;* the embanked roadway offered firm footing, the broad ditches on either side were choked with a luxuriant and varied flora; here and there, abundant blooms of *Pontederia* attracted the larger skippers, among which *viator* Edw. and an unrecognized species of similar size were frequently noted; at this date (July 28), both species had been flying for some time and were no longer in prime condition; five specimens (two males, three females) of the second species were captured in the course of the morning, and many others were seen, out of reach.

At Dr. Skinner's suggestion, these insects, which do not belong to any of our recognized species, were compared with the Boisduval-Leconte plate of *bulenta,* by which comparison it becomes apparent that they most probably represent the true *bulenta*—certainly are much nearer it than are either *byssus* or *palatka.* By Lindsey's keys they fall to the genus *Atrytone* Scud.; in their genitalic structure (Text fig. 6) they are close to, but abundantly distinct from, *byssus* Edw., thus confirming the rather remarkable prevision of Skinner & Williams in assigning this species, with *byssus,* to their genus *Problema;* the following description and the accompanying illustrations (Plate IX) should simplify future recognition of the species.

Problema bulenta Bdl.-Lec.

♂.—Head and collar above and patagia, golden brown; the thorax posteriorly and the abdomen more greenish; beneath paler and duller, the palpi, collar, and abdomen almost white;

ENTOMOLOGICAL NEWS
ACAD. NAT. SCI.
PHILADELPHIA, PENN'A.

third joint of palpi black; antennae dark above, pale beneath, annulate, the apiculus ferruginous.

Wings above clear yellow, marked and bordered with blackish brown; the dark basal markings of *byssus* are here represented by a narrow shade following the cubitus to the origin of Cu_2, by the darkening of the sub-costal and radial veins, and by a few scattered dark scales; the end of the cell is conspicuously marked on the yellow ground by a narrow lunate bar of even width, which merges at its upper end with a dash extending basally along the radius and diffusely to the costa, whence distally it joins the dark border of the outer margin; the anal vein, and thence to the inner margin, is dark, and this area is overlaid basally with yellow hairs; the dark outer margin widens at the apex, and from opposite the cell regularly to the anal angle, with short dentations between the veins and with a faint diffuse shade of scattered scales connecting it with the discal lunule; fringes concolorous with the dark border.

The secondaries have the costa broadly darkened; the dark border of the outer margin is narrowest opposite the cell, thence widening to the anal angle and continuing along the inner margin, which basally is overlaid with yellow hairs; the cell is included in the yellow ground, a few dark scales at its distal end indicating a discal bar; the cubitus and its branches, especially Cu_2, are narrowly darkened on the yellow ground; fringes dull yellow.

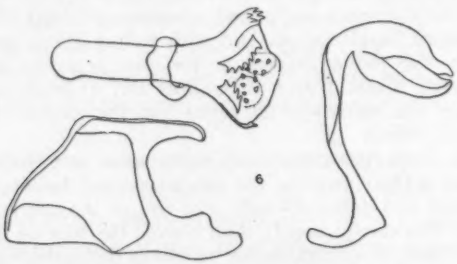
Beneath, both primaries and secondaries are yellow, the secondaries without marks; the primaries are deeper in color basally, paler and duller apically; the end of the cell is marked with a bar, less conspicuously than above; the base of the wing is densely black, this marking not reaching the costa, but filling the base of the cell, following the cubitus to the origin of Cu_1, the inner margin broadly to the anal vein, and the outer margin more diffusely to Cu_1, with scattered dark scales on the pale ground between Cu_2 and the anal vein; fringes of both wings pale dull yellow. Expanse 33 mm.

♀.—Similiar to the ♂ in ground color, but with the dark areas expanded and the veins darkened; the discal bar of primaries becomes part of a broad shade which extends distally to partial fusion with the outer border; the basal shade widens to include the base of the cell, and the whole costal area is darkened and basally overlaid with ferruginous.

The secondaries have a broad bar closing the cell and in contact with the costal border; and the darkening of the cubitus and its branches splits up the yellow area. Beneath, the secondaries are bright clear yellow, without marks; the primaries

show more tendency toward ferruginous, and the black basal area fills the cell; the diffusely blackened area of the outer margin below Cu_1 is broader than in the ♂, and between this and the densely black basal area the ground pales to almost white. Expanse 40 mm.

The ♂ insect here described as *bulenta* agrees with the Bdl.-Lec. plate in the absence of a sex-mark (*palatka* ♂ has a black sex-mark, a character too conspicuous to have been overlooked even by a careless draughtsman), in its narrow lunate discal marking, and in its almost clear yellow basal area (*byssus* ♂ has a broad diffuse bar at the end of the cell, and is widely darkened basally); in both sexes, insect and plate are in such detailed agreement that little doubt of their identity remains; the most obvious difference, the conspicuous division, on the plate, of the yellow marking of the secondaries of the ♂, may readily be due to exaggeration by the copyist of the normally darkened Cu_2.



Genitalia of Problema bulenta ♂.

The ♂ from which the drawing of the genitalia was made (with the micro slide), and the ♀ illustrated on Plate IX, have been deposited in the Academy of Natural Sciences, Philadelphia; the other ♂ whose capture is recorded, at the American Museum of Natural History, New York; a ♀, in the Barnes Collection at Decatur; the remaining ♀ in the collection of the author.

On the trip referred to above, in company with Mr. Henry Bird, the writer visited the Great Dismal Swamp area of eastern Virginia. Making Suffolk, Va., our headquarters (July 22 to

26), we found ready access to the swamp, on foot, along the embankment of the Jericho Ditch and also along the ramifications of a logging railroad which enters the swamp from its western margin a few miles further south. Open areas abounded in blooming *Clethra,* which with other flowers attracted the *Hesperiidae* in some abundance; among our interesting captures were bright fresh specimens of *Amblyscirtes textor* Hbn., several newly emerged males (no females) of *Poanes yehl* Skinner (extending the known range of the species, its identity confirmed by a study of the genitalia), and specimens which we at the time referred to *Amblyscirtes* (*Epiphyes* Dyar) *carolina* Skinner. In comparing this latter series with the type material of *carolina* it became apparent that while they seem in full agreement structurally and in the markings of the upper surface, the under surface of secondaries shows such decided divergence that their identity is seriously questionable. The type description of *carolina* reads, "Underside: ******* Inferiors brownish yellow, distinctly spotted with dark brown dots"; the Great Dismal Swamp insects reverse this character, having the ground color of secondaries, beneath, dark with the spots pale; nor do the spots of the two forms seem to be identical in position. Further investigation shows that these differences are neither sexual nor seasonal, and that the doubtful form is by no means confined to the Great Dismal Swamp region. Mr. R. C. Williams, Jr. finds no significant genitalic differences, but considers this condition inconclusive of specific identity. With this uncertainty of status, the new form is described as

Amblyscirtes carolina reversa n. var.

♂ and ♀.—Differing from typical *carolina* in coloration of under surface of secondaries, which in *reversa* are russet brown in ground color, more or less overlaid, especially along the veins, with yellow scales, and with a variable number of yellow spots; when the maximum number of spots is present, these show arrangement in two roughly semi-circular rows, the inner (at basal quarter of the wing) consisting of four, the outer (intervenular, beyond the middle) of seven spots.

Variation in the amount of yellow powdering indicates the

possibility that typical *carolina* may result from a preponderance of yellow suffusion, leaving the dark ground in the form of scattered spots.

Holotype ♂, allotype ♀, in Academy of Natural Sciences, Philadelphia; paratype ♂ and ♀, American Museum of Natural History, New York; paratype ♂ in collection of E. L. Bell; all of these from type locality, Suffolk, Virginia, July 22-24, 1925. Paratype ♂, Southern Pines, North Carolina, VII.28.1911, in the Barnes collection; four paratypes retained in the collection of the author, 1 ♂, 1 ♀ of type locality and date; 1 ♂, Summerville, South Carolina, IV.20.1907; 1 ♀, Southern Pines, North Carolina, VII.28.1911.

EXPLANATION OF PLATE IX.

Problema bulenta Bdl.-Lec., 1, 1a, male; 2, 2a, female.
Amblyscirtes carolina Skinner, 5, 5a, female (paratype).
Amblyscirtes carolina reversa Jones, 3, 3a, male; 4, female.

Thomas Lincoln Casey as a Coleopterist.

By MELVILLE H. HATCH,[1] University of Michigan, Ann Arbor, Mich.

(Continued from page 179.)

Furthermore, Casey had little regard or interest for the bibliographical aspect of his subject. In one connection (20:3) he purposely refrained from considering previous work, since he "preferred to work out as nearly as possible an original scheme, which by comparison with the others, will furnish additional coordinated data to aid future students in this very difficult subject" (the American Platyninae). He was criticized in Germany for such omission, and replied that he was too much concerned with the study of nature to spend much time in learning what others have written before him (08:163-165). This attitude was the more remarkable in that he had assembled a coleopterological library of unusual completeness.

Several of the more important attacks on his procedure may be mentioned. Walther Horn, in his review of Casey's activity

[1] Contribution from the Zoölogical Laboratory of the University of Michigan.

in the Cicindelidae in the Genera Insectorum in 1915 (pp. 369-70, 443), expresses his opinion in no uncertain terms. Out of 99 new names, 50 of them proposed by Casey as species, he finds 86 superfluous, and the remaining thirteen are no more than races. Of 19 new forms described in 1914, 11 of them as species, he says that three-fourths are local races and the remainder synonyms. Out of about 150 names proposed in Buprestidae in 1909, exactly six are retained as valid in Leng's *Catalogue* (1920:177-181), the work being that of A. S. Nicolay, W. J. Chamberlain and Leng himself. Out of 34 names proposed in 1912 in *Orthosoma* and *Prionus*, Leng retains four as valid (1920:266). Casey naturally resented these attacks, especially where the men responsible had not seen his types. He insisted that no adequate estimate of his activities was possible without reference to his material, and intimated his willingness to have his types consulted (08:393).

His interests were all in the direction of analysis. A species for him was an extremely limited group admitting little or no variation. He took evolution seriously. He decried as attacks on the inviolability of the binomial nomenclature the tendency of such scientists as Walther Horn in Cicindelidae and Hans Roeschke in Cychrini to form trinomial and quadrinomial names (08:38-41). He was not at all in sympathy with the tendency of these authors to regard a species as a group of organisms extending over a considerable area and involving numerous subspecies and varieties, each in its turn including a considerable range of individual variation. This was loose thinking. These groups were for him subgenera. Casey would have said that he could not be sure of the alleged relationship and that, until he was, the only thing he was justified in doing was to describe the several "taxonomic units" as so many entities. Casey is never impressed by the nearness of a relationship. For him a species is "not at all closely related" to any other species or "extremely isolated."

The same principle that he applied to species he applied to genera. Here, especially in such groups as the Pterostichini and Platynini, his criterion seems to have been an habitudinal one, as opposed to the more structural ones, involving definite

variations of mouth-parts or some such structure. *Bembidion* (369 species) and *Harpalus* (117 species) bear witness to the fact that large genera in themselves were not objectionable to him. In the last analysis, a genus was a matter of personal opinion (85:335).

Casey's position on matters of nomenclature may be summed up as follows: (1) The necessity for adequate descriptions. Types at best, will hardly outlast more than a few centuries, a description "printed in unalterable carbon, . . . will endure for unlimited time, if not in its original shape, at least in . . . photolithographic reproduction" (89:323). The value of figures he recognized, but except in his first paper he never overcame the technical difficulties connected with their preparation. Casey looked forward to the time, several centuries hence, when even his descriptions would be regarded as utterly inadequate, when the absolute and not merely the relative measurement of every portion of the exoskeleton of even the most minute specimens, would be required. (2) The inviolability of the generic name: In whatever form it was first proposed, regardless of good or bad philology or other errors of transcription, provided only that it was pronounceable; in that form it must be retained (example, *Bembidion, Monochamus*). (3) The inadvisability of trinomials and polynomials, at least until detailed investigation gives proof of the affinity of the forms. (4) The admissibility of specific or other descriptions, regardless of the language in which they are written.

Casey must be regarded as a prophet of the infinite complexity of taxonomic coleopterology. He started out with the certainty that he could describe species. He described for forty years, and was on the verge of intellectual bankruptcy when he died. He had begun to see things that he could not describe. The failure to provide keys to the tribes of Barinae (22:3) and the statement in the introduction to his last work (24:1), that in certain cases "a mere description, however carefully drawn up, often fails to afford certainty of identification, it being necessary to make direct comparison with types," can be interpreted in no other way. Casey was a prophet, but whether true or false, the future only will disclose—a future of

which he was not unmindful and of whose verdict he was entirely unafraid.

With the utmost concern for posterity, his collection and library were left to the National Museum in Washington. There a special room was provided for their reception, which Mrs. Casey, who survived her husband, generously equipped with two binocular microscopes and adorned with a portrait in oil of the famous coleopterist. There future students may continue the study of the problems in which Casey was so deeply interested.

In writing the above the author has drawn freely from Leng's (1925) and Schwarz and Mann's (1925) obituary notices. It should be pointed out that the present study is based entirely on published material, and it is entirely possible that a study of correspondence and other original documents would necessitate a modification of portions of this paper.

CHRONOLOGY.

Year	Age	
1857		Born, West Point, N. Y. (Feb. 19).
1874-75	17-18	Sheffield Scientific School.
1875-79	18-22	West Point.
1879	22	Second Lieutenant (June 13).
1881	24	First Lieutenant (June 17).
1882-83	25-26	Assistant Astronomer with Transit of Venus Expedition to Cape of Good Hope.
1883	26	Death of Leconte (Nov. 15). Publication of Leconte and Horn: *Class. of Col. of No. Amer.*
1884	27	First publications: Cucujidae, Contributions, Stenini. Residence in Philadelphia.
1885	28	Henshaw: *List of Col. of Amer. No. of Mex.*
1885-86	28-29	In California, published in Cal. Ac. Sci. (1885-87).
1886	29	On Greer County Commission, Texas.
1888	31	Captain (July 23); residence in Newport, R. I.
1888-93	31-36	Residence in New York.
1889-97	32-40	*Coleopterological Notices.* I-VII. (N. Y. Acad. Sci.)
1890	33	Purchase of Levette Cabinet.
1895	38	Third Supplement to Henshaw's list.
1895-99	38-42	Residence in Virginia (Norfolk, Fort Monroe).

1897	40	Death of George H. Horn (Nov. 24).
1898	41	Married Laura Welsh of Philadelphia (June 1); Major (July 5); stationed at Hampton Roads, Va.
1898-1900	41-43	Published in Jr. N. Y. Ent. Soc. (Cisidae, Coccinellidae, Dermestidae, etc.)
1901	44	Residence at Vicksburg, Miss.
1902-06	45-49	Mississippi River Commission, residence apparently at St. Louis.
1905-06	48-49	Published in Trans. Acad. Sci. St. Louis (Staphylinidae).
1906	49	Lieutenant Colonel (Sept. 26).
1906-10	49-53	Member and engineering secretary of Light House Board.
1907	50	Residence at Washington, D. C., after this year.
1907-09	50-52	Published in Wash. Acad. Sci. (Tenebrionidae, Buprestidae).
1909	52	Colonel (Sept. 21).
1910	53	Blatchley: *Coleoptera of Indiana.*
1910-24	53-67	*Memoirs on the Coleoptera I-XI.*
1912	55	Retired (Mar. 1).
1916	59	Blatchley and Leng: *Rhynchophora of N. E. Amer.*
1920	63	Leng: *Catalogue of Coleoptera of America North of Mexico.*
1925	67	Died, Washington, D. C. (Feb. 3).

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A Killing Bottle for Collecting Small Active Insects.[1]

By Z. P. METCALF, Raleigh, North Carolina.

The usual method of collecting small active insects, such as leaf hoppers, etc., is to collect them with a strong bag and to take them from the bag by means of small cyanide vials which are held in the hand with the mouth of the vial closed by the thumb, until the insect has settled to the bottom. In this way these active insects may be collected rather rapidly. The chief limitation of this method is that one must wait until the insect has settled to the bottom of the vial or become quiescent before he can remove his thumb to scoop up another specimen. On account of this delay valuable specimens will often be lost. The limitations of this method were especially noticeable in some work the writer is doing on the ecological distribution of common leaf hoppers in our mountain pastures. In this work it is desirable to secure all the specimens collected on definite areas. But by the usual method, large numbers of leaf hoppers would escape from the beating bag before they could be collected in the cyanide vial. We tried the method of placing the whole bag in a large killing bottle and waiting until the insects were killed and then sorting out the leaf hoppers. But this method was slow and the labor of sorting out the dead leaf hoppers from the weed seeds and other trash was very tedious. Finally we designed the killing tube shown in the attached cut which has proved very effective. It consists of a piece of glass tubing about four inches long by an inch in diameter. One

[1] Published with the approval of the Director of the North Carolina Agricultural Experiment Station as paper number 9 of the Journal Series.

end is closed by a cork stopper of suitable size which carries a small vial containing cyanide. The other end is closed by another cork stopper which is pierced by a glass tube of sufficient diameter to allow the largest specimen to pass and just long enough to project beyond the cork stopper at either end. This small tube is closed by a small stopper to prevent the escape of the cyanide fumes when the tube is not in use. In use the insects are scooped up by means of the smaller tube as rapidly as possible. Usually they will pass through the tube with a single leap. Hence the necessity of having the tube as short as possible. Once they have entered the larger tube there is practically no chance of their escape even though the smaller tube is open.

The cyanide may be placed in a small vial as recommended above, or it may simply be packed around the cork and covered by pieces of cardboard cut slightly larger than the tube and pressed down firmly. Tubes, in our experience, are more desirable than vials because both stoppers may be easily removed and the old cyanide taken out, the tube cleaned and new cyanide inserted.

The writer believes that this same method may be used to advantage in collecting other small insects, especially those that are very active. Hence he thinks it is worth passing on for the benefit of others.

In South America.

Mr. A. F. Porter wrote from La Paz, Bolivia, on March 18: "I am spending a few days in the capital of Bolivia after a day at Cuzco, looking over the Inca ruins, and crossing Lake Titicaca. The snow caps about this city, some of which are over 22,000 feet elevation, are very beautiful. Was out to the Museum to-day and also saw an interesting private collection. Will leave for Lima, Peru, last of week and here my real collecting will begin."

Notes on Cerambycidae with Descriptions of New Species (Coleop.).

By A. B. CHAMPLAIN and J. N. KNULL,* Penna. Bureau of Plant Industry, Harrisburg, Pennsylvania.

The following new forms and notes have accumulated, and are presented herewith.

PARAOPSIMUS New Genus.

Head slightly impressed between antennae, mandibles with tooth near apex, eyes divided, antennae extending beyond apices of elytra, scape reaching little beyond front margin of prothorax. Thorax widest in middle, with a lateral, acute, turned-up tubercle just back of middle, another near base on each side, hind margin emarginate in the arc of a circle, emargination filled with thin corneous plate. Elytra wider than thorax at base, sides nearly parallel, rounding in apical third to separately rounded apices. Prosternum extremely narrow between front coxae, femora clavate, first joint of hind tarsus longer than following joints united.

Genotype *Paraopsimus bidentatus* new species.

This genus is proposed for a species which does not fit either *Opsimus* Thoms. or *Dicentrus* Lec. It differs from *Opsimus* Thoms. by having two lateral spines on the thorax, and from *Dicentrus* Lec. by the clavate femora, length of antennal joints and antennae, the first joint not being as long as the two following joints.

This genus should be placed in the *Saphanini* between *Opsimus* Thoms. and *Dicentrus* Lec.

Paraopsimus bidentatus new species.

Brunneous above and below, ochraceous pubescence sparse, ventral surface shining, nearly void of pubescence. Head sparsely punctate on front, vertex slightly rugose, punctures sparse; antennae reaching beyond the end of elytra in female, second joint shorter than third, third and fourth joints about equal in length, fifth longer, following joints decreasing in length.

Thorax wider than long, convex constricted at apex and at base, sides widened to back of middle, strongly constricted to

* Authors names arranged alphabetically.

base, tubercles as stated above, surface granulate, center slightly depressed, transverse depression at base. Scutellum as wide as long, rounded posteriorly. Elytra with sides nearly parallel, rounding in apical third to separately rounded apices, surface finely granulate, two faint costae on each elytron, surface sparsely covered with very fine ochraceous pubescence, longer hairs irregularly placed. Ventral surface of thorax slightly transversely strigose, abdomen sparsely punctate. Length 12.5 mm.; width 2.5 mm.

Type a female in authors' collection, labeled Subalpine Region, A. L. Lovett, and probably from the State of Oregon.

Strangalia abdominalis Hald.—This species was reared from the sapwood of a dead standing bald cypress *(Taxodium distichum)* collected at Cape Henry, Virginia.

Leptostylus bahamicus Fisher—Adults of this recently described West Indian species were collected at Paradise Key, Florida, April 4 and April 10. (Determinations through the kindness of Mr. W. S. Fisher.)

Ataxia brunneus new species.

Resembling *Ataxia hubbardi* Fisher in size and form; covered above and below with recumbent ochraceous pubescence, intermixed with cinerous on ventral surface, semi-erect hairs arising from the irregular punctures.

Head coarsely punctured, concave between antennae tubercles, eyes coarsely granulate, antennae not extending to end of elytra in female, annulated, cinereous recumbent pubescence on all but first two joints, long hairs scattered irregularly over joints, first joint with slight trace of cicatrix at apex.

Thorax wider than long, widest at base, constricted anteriorly, sides arcuate from base to apex, an acute tubercle in middle on each side, disk irregularly densely punctured. Scutellum triangular, rounded posteriorly. Elytra about two and one-half times as long as wide, wider than thorax at base, sides nearly parallel, rounded anteriorly to separately rounded apices, disk irregularly deeply punctured, punctures larger and more numerous toward base. Mesosternum with groove more prominent posteriorly.

Abdomen irregularly lightly punctured, last ventral truncate at tip, broad concave depression at apex, legs covered with cinereous and ochraceous pubescence. Length 12.5 mm.; width 4 mm.

Type a female labeled northern Illinois, in the collection of the authors.

This species resembles *Ataxia hubbardi* Fisher very closely, but can easily be separated by the punctures of the elytra being finer and by the color of the pubescence on the dorsal surface.

We are indebted to Mr. W. S. Fisher for comparing the specimen with the type of *Ataxia hubbardi* Fisher.

The "Ponderable" Substance of Aphids (Homop.).

By GLENN W. HERRICK, Cornell University, Ithaca, New York.

The number of species of living insects is very great. A late authority says that there are 470,000 species of insects now known and it is estimated that the total number now living is probably more than two millions. To visualize the number of known species it may suffice to say that if the mere names of these insects were printed in two columns to a page with 45 names in each column they would fill ten volumes of 500 pages each and there would be 20,000 names left over. This enormous number of living animals must find food and find it in abundance if they are to maintain themselves on the earth. A consideration, however, of the number, only, of species of insects on the earth does not convey the full significance of the real situation concerning these tiny animals and their relation to man. A fuller realization of the role of insects on the earth will be grasped when one considers the number of individuals that may arise in any one of the existing species.

Many years ago Huxley estimated that in the course of ten generations, supposing all of the individuals to survive, the progeny of a single aphid would "contain more ponderable substance than 500 millions of stout men; that is, more than the whole population of China." It has been of considerable interest in the light of some detailed investigations of the biology of certain aphids, especially the common cabbage aphid *(Brevicoryne brassicae)*, to ponder a bit over this estimate of Huxley's.

In a study of the life cycle of the cabbage aphid the insect was carried through a period of slightly more than one year (Mar. 31, 1910, to Apr. 6, 1911) and, in that time was found

to produce thirty generations with an average of 12 2/5 days for each generation. It was also determined that each female, on the average produced 41+ young. From March 31 to August 15 there were twelve full generations and by October 2, sixteen generations had been produced. To obtain an approximate idea of the total number of individuals, had all of them lived, present on October 2, it is but necessary to solve a simple arithmetical problem in geometrical progression in which the first term is 1, the ratio is 41, and the number of terms is 16, to find the sum of the series. We need not go far with this problem for it will be seen, at once, that 41 raised to the 16th power will produce a number that will reach many periods to the left. It will be worth while, however, to determine, roughly, the ponderable substance of the cabbage aphids that might be present at the end of the 12th generation by the middle of August, if all of the progeny were to survive. Here, again, we have a simple problem expressed by the formula $\frac{1 \times 41^{12}-1}{41-1}$, a solution of which indicates that, at the end of twelve generations if all lived, there would be 564,087,257,509,154,652 aphids present, supposing room could be found for them. What, then will be the ponderable substance of that number of aphids? In other words, how much will 564-odd quadrillion cabbage aphids weigh?

With these queries running in mind I selected four, average, viviparous, agamic females of the cabbage aphid and taking them over to my colleague in chemistry asked him to weigh them on his very accurate balance. Three of the aphids were placed in the pan of the balance and the weights were carefully adjusted when the chemist said "drop on the other one." I did so and for the moment, I was as much interested in the cunning and deftness of the hand of man in devising and fashioning an instrument so sensitive and delicately accurate, as I was in the capacity of an aphid to reproduce itself. The fourth apid, at once became an elephant. The balance responded with fearful vigor and I caught my breath. The long slender pointer raced through its arc and appeared sure to swing out into space and never return; but it did return and a little delicate adjust-

ment showed that the four aphids weighed just 5.6 milligrams, an average of 1.4 milligrams each.

A simple multiplication demonstrates then, that 564-odd quadrillion aphids present on August fifteenth would actually weigh 789-odd quadrillion milligrams which, by reduction, gives 789,722,160,512,816 grams. If now we consider roughly that 30 grams equal an ounce avoirdupois we find the weight of the aphids to be 26,324,072,017,093 ounces and a further division by 16 gives 1,645,254,501,068 pounds which reduced to tons gives us the staggering number of 822-odd million tons of ponderable substance in the progeny of one stem-mother cabbage aphid born on the last day of March, provided they all survive and are present on the fifteenth day of the following August. In the face of the foregoing figures the estimate of Mr. Huxley pales into insignificance, for 500,000,000 stout men, if they averaged 200 pounds each, would weigh altogether but a mere bagatelle of 50,000,000 tons. Moreover, the cabbage aphid, in the temperate latitude of New York State, has a comparatively slow reproductive capacity. If we consider the melon and cotton aphid *(Aphis gossypii)* and its reproductive capacity as determined in Texas, we shall find that the average number of young produced by a single female is 84.4, and that the number of generations in a year exceeds those of the cabbage aphid. The melon and cotton aphid at this rate in ten generations would far outstrip the estimate of Huxley, as anyone who has a taste for the multiplication table can determine in a few minutes. The common "green-bug" or spring grain aphid *(Toxoptera graminum)*, each viviparous, agamic female of which, produces an average of 59.8 young would also greatly exceed Huxley's estimate.

Do our figures seem fanciful? We must admit they do. Do they indicate a probable situation? Certainly not one that has ever happened so far as we know. Is there a possibility of such a thing taking place? The life history of aphids, their rate of reproduction, and infested fields of wheat, melons, and cabbages that we have seen certainly indicate tremendous possibilities in the direction of the figures we have given. Who, then, shall eventually inhabit the earth, man or insect? I am not

particularly pessimistic about the answer and whenever I begin to think of these matters I always recall what one of my colleagues has said; "If you want to hear that the world is going to the bow-wows just listen to an economic entomologist talk", and, at once, I return to sanity.

Notes on the Habits of Formica dakotensis specularis (Emery) (Hym.: Formicidae).

By C. E. Abbott, B.A., Elgin, Illinois.

In May, 1925, east of the city of Madison, I discovered a few colonies of *Formica dakotensis specularis*. The nest which most engaged my attention was located on the side of an embankment, and varied in height from two to eighteen inches. It was about a foot in diameter, and contained a central core, about twelve inches deep, of loose sticks and similar materials. When the loose material was removed, the remaining portions of the nest were seen to consist of earth much perforated by tunnels.

A number of the adult workers, larvae, and pupae were transferred to an artificial nest. Although the queen was not included, this fragment of the original colony prospered for nearly a month, and during this time frequent notes were taken on the behavior of the insects.

They would not eat much pastry, but were quite fond of apple, the buccal pellets of which could be seen near the feeding place or on their dumping grounds. Flies and cockroaches placed in the nest were killed and eaten. The ants pursued the intruders, bit off their appendages, and gradually consumed all but the harder chitinous parts.

The ants cast all such waste materials out of the nest or placed it in definite spots. When they were first moved into their new quarters, they took with them a number of sticks approximately 5 cm. long. Later they threw these into the moat that surrounded the nest. They finally put all their trash into one of the larger depressions of the nest. Sticks, solid bits of toweling, buccal pellets, and the hard parts of insects, not to mention dead members of the colony, found their way to this kitchen midden. The bits of toweling referred to were

taken from strips that supported the glass over the nest. The emmets had a way of detaching separate threads, pulling these apart to form a downy mass, and covering their larvae with this soft material.

The sense of smell is well developed in *F. dakotensis specularis*. When a number of pupae were taken from the nest and placed with some bits of wood resembling them in size and shape, the ants did not hesitate to carry the former back to the nest. The sticks, which I had purposely handled with my fingers, were attacked and deserted. The breath was sufficiently offensive to the insects, to bring them out in great numbers. If the face was near the nest at such times, a stinging sensation and the odor of formic acid were evident. The introduction of the breath into the nest through a glass tube threw them into a state of great excitement. They rushed about with waving antennae and open jaws; they attempted to bite the tubing; some carried away the pupae that were nearest the tube. Sticks soaked in methyl salicylate or pyridine were sedulously avoided.

Ordinarily fond of honey, the insects refused to eat some which contained strychnine. Some tried time after time to eat it, but the presence of the drug evidently prevented them from so doing. The drug was very evident to human end-organs.

F. dakotensis specularis seemed very sensitive to shock. A slight jarring of the nest threw them into a panic.

These ants carried their pupae from white, blue, or green light into complete darkness. They do not react to red. They appear to see objects at some distance. This is especially evident when their behavior is compared with that of *Camponotus pennsylvanicus*, which is aware of intruders in its nest chiefly by smell, and will snap savagely at their trails. *F. dakotensis specularis* will perceive an enemy at a distance of several centimeters. These ants fasten their jaws to an object with a steady grip. While thus engaged they often double the gaster under the thorax.

A small species of mite, which was not identified, was found in the nest. Some were attached to the legs of the ants, while others were wandering freely about.

Frank Cowan and His "History of Insects."

By HARRY B. WEISS, New Brunswick, New Jersey.

It is doubtful, in these days of esoteric entomology, if many entomologists are familiar with Cowan's "Curious Facts in the History of Insects, including Spiders and Scorpions" published by J. B. Lippincott & Co., in 1865. To the erudite it may seem fanciful and jejune, but to those who desire to see insects in their historical settings, Cowan's book will prove to be interesting and diverting.

It is actually a collection of statements ransacked from the writings of Greek, Roman and later authors dealing with early beliefs and superstitions about insects. Books of travel, history, poetry and suppletive works in great number yielded their entomology to Cowan's industry. Such historical settings are not scientific facts as we understand them today, or even as they were understood in 1865, and although some of the assertions quoted may have been true, others are obviously absurd. Cowan makes it plain in the preface to his book, that he is not concerned with the natural history of insects or with the actuality of the facts that he presents, but that he is dealing for the most part with the averments of various writers.

The arrangements of his material by orders and families of insects has a particular appeal to one with some knowledge of entomology, making it possible to locate immediately, the myths about an insect or family, and does not detract from the enjoyment of the non-entomological reader. Cowan's book appeared eleven years after Jaeger's "Life of North American Insects" and both were written apparently for the general reader. Cowan's being notably free from periphrasis and technical abracadabra and bringing together as it does, a mass of insect mythology is the more valuable of the two and furnishes a sort of early historical background for the study of entomology.

The author was born in Greensburg, Pennsylvania, December

11, 1844. His father Edgar Cowan was United States senator from the same state, having been elected in 1861 by the people's party and serving until 1867. Frank Cowan studied at Mount Pleasant and Jefferson colleges but did not graduate from either. In 1862 he became secretary of the senate committee on patents, of which his father was chairman and during the vacations of congress, read law with his father, being admitted to the bar in 1865.

It was during the winter of 1863-64, when having the use of the Congressional Library at Washington, he began at the age of nineteen, the compilation of his "History of Insects." Glover was the entomological expert at Washington at this time and his early writings were published in the Reports of the United States Commission on Patents. It is doubtful if Cowan received any help from Glover during the compilation of his book. No mention is made of Glover in the preface where Cowan discharges his obligations to other persons. In 1866 Cowan became one of the secretaries of President Johnson. In 1867 he began the study of medicine in the Georgetown medical college and received his degree in 1869. Thus he lived, worked and studied in Washington at a time when Andrew Johnson was occupied with post-war reconstruction, constant conflict with the Senate and his impeachment by the House of Representatives. Later Cowan wrote under the titles, "The Personnel of the United States Senate at the Close of the War of 1861-65," and "Reminiscences of Andrew Johnson."

From 1869 until 1872 he practised medicine in Greensburg and then became editor and proprietor of an industrial journal known as "Frank Cowan's Paper," which continued to 1875. In 1878 he was district attorney of his county and in 1880-81 made a tour of the world, entering Corea in advance of treaties between that and other countries and making an ethnological collection as well as sending to the United States government, information about the exports and imports of Corea. In 1882

he resumed the practice of law and in 1884-85 made a second tour of the world. In 1895-96 he was general superintendent of the Westmoreland Hospital and for some years previous to his death in 1905 devoted his time to fruit-growing and writing.

His versatility is shown by his authorship of various pamphlets and magazine articles dealing with medical, historical, anthropological and evolutionary subjects, by his musical compositions, poems, the work on insects referred to above and the following list of books which does not aim at completeness. It is recorded that one of his articles "The Hvidsaerk Inscription at the Falls of the Potomac" (1866) was a deception, which although instantly explained, found its way into European books of reference. "Zomara, a Romance of Spain" (Pittsburgh, Pa., 1873); "Southwestern Pennsylvania in Song and Story," with as appendix of Battle Ballads (Greensburg, Pa., 1878); "An American Story Book, short studies from life in Southwestern Pennsylvania" (Greensburg, Pa., 1881); "The City of the Royal Palm and other Poems" (Rio de Janeiro, 1884); "A Visit in Verse to Halemaumau" (Honolulu, 1885); "Fact and Fancy in New Zealand." "The Terraces of Rotomohana: a Poem," etc. (Auckland, N. Z., 1885); "Australia, a Charcoal Sketch" (Greensburg, Pa., 1886); "Dictionary of Proverbial Phrases Relating to the Sea."

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Grateful acknowledgement is herewith made for the help received from the State Library at Trenton, New Jersey, the Rutgers College Library and Mr. George L. Walters of Philadelphia, who furnished me with notes referring to such of Cowan's publications as were to be found in several Philadelphia libraries, including that of the Pennsylvania Historical Society.

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., JULY, 1926.

Henry Skinner.

The two men to whose exertions the early years and successes of ENTOMOLOGICAL NEWS were due have passed away within six weeks of each other. In last month's issue we recounted our debt to Ezra Townsend Cresson. Now we sorrowfully try to realize the departure from this life of Henry Skinner. He was not the first editor of the NEWS, but he assumed its direction two months after its first appearance and continued as its pilot until December 15, 1910, when after nearly twenty-one years, he was relieved at his own request. For an additional period of sixteen years, as Editor Emeritus, his assistance has always been available.

We plan to publish an account of his life and work in the next (October) number of the NEWS.

Changes of Addresses.

C. L. Frankenfield, Box 85, Keego Harbor, Mich.
Arthur B. Wells, Alicia, Saginaw Co., Mich.
Ernest J. Oslar, 4189 Julian St., Denver, Colo.
J. W. McBurney, Industrial Bldg., Bur. of Standards, Washington, D. C.
Clarence O. Bare, Box 1182, Plant City, Fla.
James G. Needham, 6 Needham Place, Ithaca, N. Y.

Personal Mention.

Prof. T. D. A. Cockerell is president of the Southwestern Division of the American Association for the Advancement of Science.

Dr. A. L. Melander has resigned from the Department of Zoology and Entomology of the Washington State College to accept a position at the College of the City of New York.

May I ask you to announce in one of the forthcoming issues of ENTOMOLOGICAL NEWS, that I have left today (May 15, 1926) for England, as a member of the Harvard African Expedition. We expect to be absent from the States for about a year. The party is under the leadership of Professor R. P. Strong, Head of the Department of Tropical Medicine of Harvard Medical School. There are eight members in all. The Expedition will carry on medical and biological investigations, in Liberia and in the Belgian Congo. JOS. BEQUAERT.

Entomological Literature

COMPILED BY E. T. CRESSON, JR.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

The numbers in Heavy-Faced Type refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

Papers of systematic nature will be found in the paragraph beginning with (N). Those pertaining to Neotropical species only will be found in paragraphs beginning with (S). Those containing descriptions of new forms are preceded by an *.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

Papers published in the Entomological News are not listed.

1—Trans., American Ent. Soc., Philadelphia. **4**—Canadian Ent., Guelph. **5**—Psyche, Cambridge, Mass. **6**—Jour., New York Ent. Soc., New York. **7**—Ann., Ent. Soc. America, Columbus, Ohio. **8**—Ent. Monthly Mag., London. **9**—Entomologist, London. **10**—Proc., Ent. Soc., Washington. **11**—Deutsche Ent. Zeitschrift, Berlin. **12**—Jour. of Economic Ent. **15**—Insecutor Inscitiae Menstruus, Washington. **17**—Ent. Rundschau, Stuttgart. **18**—Intern. Ent. Zeitschrift, Guben. **19**—Bull., Brooklyn Ent. Soc. **20**—Societas Entomologica, Stuttgart. **26**—Ent. Anzeiger, Wien. **36**—Trans., Ent. Soc. London. **50**—Proc., U. S. National Museum. **55**—Pan-Pacific Ent., San Francisco. **59**—Encyclopedie Entomologie, Paris. **60**—Stettiner Ent. Zeitung. **61**—Proc., California Acad. Sci. **69**—Comptes R., Acad. Sci. Paris. **72**—EOS, Rev. Espanola Ent., Madrid. **75**—Ann. & Mag. of Nat. Hist., London. **77**—Comptes R., Soc. Biologie, Paris. **104**—Zeit. f. Wissens. Zool., Leipzig. **107**—Biologisches Zentralblatt. **111**—Archiv f. Naturgeschichte, Berlin. **113**—Jour. Agric. Research, Washington.

126—Revista Chilena Hist. Nat. 130—Ohio Jour. Sciences, Columbus. 135—Quarterly Jour. Microscopic Sci. 137—Archiv f. Zoologi, Stockholm. 141—Amer. Naturalist. 142—Archiv Zool. Experm. et Generale, Paris. 154—Zool. Anzeiger, Leipzig.

GENERAL.—Bateson, W.—The evolution of the colours and patterns of cuckoos' eggs and its relation to that of insect resemblances, such as mimicry.—**36,** 1925, p. xcvi-civ. **Bergroth, E. E.**—Obituary notice.—**19,** xxi, 15-17. **Brethes, J.**—Sur quelques insectes de San Jose de Maipo.—**126,** xxix, 34-5. ***Cockerell, T. D. A.**—Tertiary fossil insects from Argentina.—Am. Jour. Sci., xi, 500-4. **Edelsten, H. M.**—Weather conditions affecting collecting by light.—**9,** lix, 147-8. **Emery, C.**—Obituary notice by A. Forel.—Bul. Soc. Vaud. Sc. Nat., lvi, 23-4. **Felt, E. P.**—The physical basis of insect drift.—Nature, London, cxvii, 754-5. **Felt & Bishop.**—Science and scientific names.—**141,** lx, 275-81. **Hamlin, J. C.**—Biological notes on important opuntia insects of the U. S.—**55,** ii, 97. **Harrison, L.**—Ectoparasitic insects and Pacific problems. [Abstract]—Proc. Pan-Pacific Sci. Cong., ii, p. 1584-5. **Herms, W. B.**—Effects of parasitism on the host and on the parasite.—**12,** xix, 316-25. **Howard, L. O.**—Parasitic element of natural control of injurious insects and its control by man.—**12,** xix, 271-82. **Huard, V. A.**—Du role des insectes dans la nature.—Le Naturl. Can., lii, 251-6 (cont.) **Jones, D. W.**—Some notes on the technic of handling parasites.—**12,** xix, 311-16. **Krausse, A.**—Ewonal, ein neues einbettungsmittel.—**18,** xx, 33-4. **McAtee, W. L.**—Insect taxonomy: preserving a sense of proportion.—**10,** xxviii, 68-70. **May, E.**—Die tier und der winter.—Ber. Senck. Naturf. Ges., lvi, 1-7. **Onel, A.**—Insectos que se fingen muertos.—**126,** xxix, 303-4. **Ruediger, E.**—Der Rückgang der insektenwelt.—**17,** xliii, 17-18. **Ruediger, E.**—Entomologie und zettelkatalog.—**17,** xliii, 15. **Schulze, Kuekenthal, Heider, Kuhlgatz.**—Nomenclator animalium generum et subgenerum.—Preuss. Akad. Wissens. zu Berlin, i, Lief. 1; A-Anaj. **Shelford, V. E.**—Methods for the experimental study of the relations of insects to weather.—**12,** xix, 251-61. **Weiss, H. B.**—Samuel Purchas and his "Theatre of political flying insects."—**6,** xxxiv, 71-7. **Woodruff, L. B.**—Obituary notice with bibliography.—**6,** xxxiv, 23-5.

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(N) ***Mason, A. C.**—Two n. sps. of thrips from California.—**55,** ii, 155-7.

(S) ***Navas, L.**—Crisopidos neotropicos. Insectos neotropicos.—**126,** xxix, 8-13; 305-13. **Snyder, T. E.**—Termites collected on the Mulford Biol. Expl. to the Amazon basin, 1921-22.—**50,** lxviii, Art. 14.

ORTHOPTERA.—Caudell, A. N.—Melanoplus borealis in New York state (Acrididae).—**10,** xxviii, 70. **Davis, W. T.**—Annotated list of the Dermaptera and Orthoptera collected in mid-summer at Wingina, Va., and vicinity.—**6,** xxxiv, 27-41. **Ford, N.**—On the behavior of Grylloblatta.—**4,** lviii, 66-70. **Morse, A. P.**—Two vagrant grasshoppers and a moth.—**5,** xxxiii, 53. **Worthington, E. B.**—Life-cycle of Forficula auricularia.—**9,** lix, 138-42.

(N) **Hebard, M.**—Key to the N. A. genera of the Acridinae which occur north of Mexico.—**1,** lii, 47-59.

(S) ***Werner, F.**—Species novae Mantidarum ex Mus. Brasiliensi.—**20,** xli, 17-18.

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ther records on Heteroptera from Mass.—**19,** xxi, 53-5. **Whittiker, O.**—Records of hemiptera from Br. Columbia. —**4,** lviii, 63.

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LEPIDOPTERA.—Baylis, H. A.—Colour-production in L.: a further note.—**9,** lix, 124-6. **Bell, E. L.**—Three rare butterflies from Long Island, N. Y.—**19,** xxi, 26. **Cook, W. C.**—Methods of collecting moths.—**4,** lviii, 105-8. **Engelhardt, G. P.**—Periodical swarming of Celerio lineata in Ecuador.—**19,** xxi, 27-8. **Eyer, J. R.**—Morphological significance of the juxta in the male genitalia of L.—**19,** xxi, 32-7. **Hamlin, J. C.**—(see under General). **Harrison, J. W. H.**—Miscellaneous observations on the induction, incidence and inheritance of melanism in the L.—**9,** lix, 121-3. **Iucci, C.**—La capacita di sviluppo dell'uovo, vergine o fecondato, nei bachi da seta (Bombyx mori).—Bol. Istit. Zool. Univ. Roma, iii, 86-99. **Lenz, F.**—Ueber die ursachen des misslingens von raupenzuchten.—**18,** xx, 30-2. **Morse, A. P.**—(see under Orthoptera). **Porritt, G. T.**—Induction of melanism in the lepidoptera and its subsequent inheritance.—**8,** lxii, 107-11. **Roeher, A.**—Ueber lauterzeugung bei schmetterlingen.—**26,** vi, 51. **Rogers, D. P.**—Early butterflies.—**19,** xxi, 42. **Tschirwinsky, P.**—Gibt es ein gleichgewicht der farben bei schmetterlingen?—**107,** xlvi, 229-31. **Vignon, P.**—Le papillon qui feconde les yuccas.—La Nature, Paris, 1926, 255-6.

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COLEOPTERA.—Back & Cotton.—Anthrenus seminiveus.—**10,** xxviii, 64. **Balduff, W. V.**—On the habits and development of a checkered beetle (Cymatodera undulata).—**1,** lii, 29-37. **Beamer, R. H.**—Note on collecting Eleodes hispilabris nupta.—**19,** xxi, 39. **Boeving, A. G.**—Immature stages of Eulechriops gossypii, with comments on the classification of the tribe Zygopsini (Curculionidae).—**10,** xxviii,

54-62. **Chittenden, F. H.**—Note on Coccinella oculata.—**19,** xxi, 37. **Davis, A. C.**—Habits of Cymatodera decipiens.—**55,** ii, 126. **Forbes, W. T. M.**—Wing folding patterns of the coleoptera.—**6,** xxxiv, 42-68. **Giltay, L.**—Remarques sur la classification et la phylogenie des familles d'araignees.—**33,** lxvi, 115-31. **Glasgow, R. D.**—May beetle with the pronotum showing a complete median division.—**19,** xxi, 40-2. **Hamlin, J. C.**—(see under General). **Munster, A. T.**—Om praeparation, etc. Saerlig av coleoptera.—Norsk Ent. Tidssk., ii, 109-12. **Schott, F. M.**—About some newcomers.—**19,** xxi, 17. **Schwarz, E. A.**—Condition of the coleopterous collection of the Nat. Museum in 1906.—**10,** xxviii, 71-86. **Smith & Hadley.**—The Japanese beetle.—U. S. Dept. Agr., Circ. 363. **Van Dyke, E. C.**—Certain peculiarities of the coleopterous fauna of the Pacific northwest.—**7,** xix, 1-12. **Van Dyke, E. C.**—Habits of Trachykele nimbosa.—**55,** ii, 126. **Wolff u. Krausse.**—Beiträge zur kenntnis der biologie von oelfruchtschädlingen, insbesondere über den anteil der von Ceuthorrhynchus assimillis. . . —**111,** 1925, A, Heft 4, 1-45.

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HYMENOPTERA.—Ankel, W. E.—Sinnesphysiologie und "Sprache" der bienen.—Ber. Senck. Naturf. Ges., lvi, 65-74. **Brocher, F.**—La pollinisation du pois sauvage et le xylocope.—Bul. Soc. Zool. Geneve, iii, 61-3. **Cretschmar, M.**—Spinnenfeinde unter den hymenopteren.—Ber. Senck.

Naturf. Ges., lvi, 7-12. **Fernald, H. T.**—Climate and coloration in some wasps.—**7,** xix, 88-92. **Flanders, S. E.**—Notes on parasites at Saticoy, Cal., during the year 1925.—**55,** ii, 157-8. **Hill, C. C.**—Platygaster hiemalis a parasite of the hessian fly.—**113,** xxxii, 261-75. **Reichensperger, A.**—Beobachtungen und versuche mit Cataglyphis und Thorictus nebst dessen metamorphose.—Verh. Naturh. Ver., Rheinl. u. Westf. lxxxii, 73-110. **Robertson, C.**—Wing veins of bees as strengthening elements.—**5,** xxxiii, 39-41. **Verlaine, L.**—Instinct et l'intelligence chez les hymenopteres. Acquisition des habitudes chez la Vespa germanica.—**33,** lxvi, 133-45.

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